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A REVIEW OF GENUS ZERENE HBN. IN THE UNITED STATES (LEPID., RHOPALOCERA)

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Two valid species of the genus *Zerene* Hbn. (dog-faced butterflies) are found in the United States, north of Mexico, but not reaching Canada. The best known of the two probably is *Zerene cæsonia* Stoll which occurs plentifully in the southern states, ranging northward up the Mississippi valley and extending westward sparingly through New Mexico and Arizona into California, where it has recently established an additional habitat in the Imperial Valley. Specimens have also been taken rarely as far north as the San Francisco Bay region. The other species is *Zerene eurydice* Bdv., which is found only in California, being particularly common in the San Bernardino mountains of southern California, also occurring northward, as first reported by various early writers, as far as Mendocino County. It can be said that *eurydice* is more of a mountain butterfly, while *cæsonia* prefers the plains and low altitudes. I cannot see enough constant difference between *cæsonia* as found in eastern United States and similar specimens taken in the West to make a racial separation. It is true that *cæsonia,* as found in New Mexico and Arizona and adjacent northern states, is less broadly marked, but similar specimens may be sorted out wherever *cæsonia* flies in quantity. In some localities in the East the under side appears more ruddy (perhaps a seasonal form) and the maculation heavier; in these particulars they differ somewhat.

Entomological writers in the past have always wondered just how near *cæsonia* and *eurydice* converge, or if there is a connecting link between them. Typical male *eurydice* is of course easily told from male *cæsonia* by its brilliant reddish sheen over upper side of primaries. This superficial difference is well known and has been shown for years by Edwards, Wright and

others in their colored plates. The distinction, or rather unity as I will show (compare fig. "X" on *cæsonia* plate with similar fig. "X" on *eurydice* plate) between the females, has never been worked out and that is the primary reason for this article, for I believe it is in the forms of this sex that a common ancestor may some day be traced.

Explanation of Plate 1. *Zerene eurydice* Bdv.

The genus *Zerene* is closely related to, and probably was formerly united with, the genus *Eurymus* (Colias). Aside from neurational variance, a character peculiar to the female, and superficial differences, they are practically first cousins. The *Eurymi* undoubtedly had their origin in northern or higher altitudes. They are considered mountain butterflies because the majority of the earth's valid species are found where cooler conditions prevail. Long habitation in cooler localities tends to lighten pattern, so we find *Zerene eurydice* with the weaker maculation only in the mountains, and showing the result of an extended existence under those conditions. Its females are immaculate or rarely marked and the males generally have clear secondaries. They represent as complete a reversion to prehistoric parentage, parallel with the *Eurymi,* as time and surroundings have allowed. Kindred species from the mountains of South America also show suppression of pattern, so I believe typical *eurydice* when compared with *cæsonia* will prove to be the elder of the two species, at least as they exist on the North American continent. The mountains of southern California where *eurydice* is found are not becoming any higher or colder; in fact, according to geology, there is every evidence of the opposite trend, especially as regards climate; therefore we find *eurydice* gradually adapting itself to a warmer era, as first evinced by its forms and transition forms.

As hinted above, an increased temperature promotes design and we find female *eurydice* thus responding to the stimulus by gradually and naturally copying the wing pattern possessed by its male. This is shown on the plate by form *masumbrosus,* figs. 1 to 6. These specimens are still considered uncommon, but may be estimated at 5 per cent of a season's catch. The darker the specimens the rarer they are, which is natural because time has not allowed for the proportionate increase in numbers of

the more matured individuals. *Masumbrosus* first displays itself as a dash of black along the costal margin, starting at the base of the wing on the upper side of primaries. This will be noted by examining fig. 1 and comparing it with typical ♀ *eurydice* shown at its left. So far I can record no specimen with maculation advanced beyond fig. 6, which itself is only advanced half as far as any typical ♀ *cæsonia*. A further comparison of form *masumbrosus* also shows an entire lack of any black border markings at outer margin on secondaries, there being only a submarginal row of spots and dashes thus far produced. Time alone in the distant future will tell whether an outer margin can be added, for certainly the environmental power of the present habitat has not been sufficient to date. However, there is evidence of continued development, and it lies within the future ability of form ♂ *lineainita* to force an average of its dark-lined secondaries upon the female and thereby open up and bring development to the outer margins of *masumbrosus* which would be comparable and parallel, probably, to the ancient descending stages of female *cæsonia*. Should assistance not be forthcoming for it, then the supposition is that *masumbrosus* has the quality for diverging from the present species *eurydice* into a future species even more different than *cæsonia* has developed into.

Form ♂ *lineainita* is rare in collections; only eight or ten specimens are known to exist. Form ♂ *bernardino* has been previously listed as a race. This is entirely incorrect as no females exist for it alone. Male *bernardino* and typical male *curydice* fly together in the San Bernardino mountains and elsewhere. It is simply a black-margined form of the male and is in no sense a race or subspecies. It is illustrated on the plate by figs. A, B, and C. Tr. f. *fanniæ* is the result primarily of a melanifusistic agency affecting the male and in turn probably the female, strengthening the dark cell areas and bringing to *eurydice* a heavy cell pattern comparable to that found in both sexes of *cæsonia*. (Note figs. A to C of form ♂ *bernardino*, comparing the sequence of their cell areas with those in both sexes of *cæsonia*). Tr. f. *newcombi* represents a premature, yet eventual, ground color change from orange, found on present *eurydice*, nearly to the yellow found on *cæsonia*; the inference

being that *eurydice* will follow the trend of *cæsonia*. All butterflies have a graduated color change from red, orange or yellow through to white, and reverse. Chromatic sequence has been mentioned in former *Entomological News* articles.

Explanation of Plate 2. *Zerene cæsonia* Stoll.

As previously stated, *cæsonia* is a low altitude or plains butterfly. It has long since left its original mountain habitat to become indigenous in a warmer environment, spreading down from the hills over the semitropical plains of both North and South America. The female has almost perfectly acquired the darker patterns of the male, probably reaching its climax of development as shown by fig. 6. With its present warmer surroundings, rarely does it produce a lighter patterned, retrogressive strain such as form ♀ *immaculsecunda* which represents a reversion to its ancestral mountain first cousin *Zerene eurydice*, form ♀ *masumbrosus*. The ♂s of *cæsonia* also become slightly atavistic as illustrated by their secondary phases from figs. A to D. I have seen no ♂s which have absolutely unmargined secondaries. A form called *rosea* Roeber has been named which has small black stripes instead of the black marginal band on the secondaries. This is shown by fig. ♂B and fig. ♀3. The illustrated specimens are from New Mexico. It has undoubtedly served the same purpose for *cæsonia*, as I have suggested above, that form ♂ *lineainita* serves for *eurydice*. The more level nature of the vast territories over which *cæsonia* has spread gives it an immense area of habitation, and its past colonization must have been fairly easy and rapid. There are millions of *cæsonia* as compared to hundreds of *eurydice* which only has its confined mountain districts to range upon.

Description of New Forms Mentioned in Above Text

Zerene eurydice Bdv. **masumbrosus**, form ♀ nov.

A sexual form occurring only among the females, having on the upper side of primaries a meager outline in black of a "dog face" of which the black spot of the cell reproduces the position of the "eye." This (male shadow) on the female follows the same style and contour as that found on the male. Extreme examples, other than the designated holotype, have a submarginal row of four or five obscure black spots on the secondaries;

occasionally a spot in this row opposite the cell may be connected with it by a dash of additional black. The under sides are as in typical ♀ *eurydice*.

Data: Holotype ♀, illustrated by actual photographic reproduction as fig. 3 on plate No. 1; from California; labeled "Eurydice ♀ var." (not in Hy. Edw.s' own handwriting) in the Hy. Edw. Coll., Am. Mus. Nat. Hist., New York.

Note: About a year ago I examined the type of *amorphæ* Hy. Edw. in his collection at the American Museum. Since then I have corresponded with Mr. Frank Watson a number of times about it and he has kindly had photos made of it for me. The type is a male and the type label is in Hy. Edwards' own handwriting on green label, which says: "Meg. eurydice, var. amorphæ Hy. Edw." The description of it by Hy. Edw. describes a male, but I feel that both his type and his original description represent a typical predescribed male *eurydice* Bdv. Henry Edwards thought that his one male specimen, when he described it, had a different "suffusion with richest purple," but Boisduval's prior type also has "un reflect violet changeant"; so the two are the same thing and thus *amorphæ* Hy. Edw. falls as a synonym directly under *eurydice* Bdv. William Beutenmuller, who published a list of the Edwards' types after his death, and who should know, says: "One male; Mendocino County, Calif.," for "*Colias eurydice,* var. *amorphæ* Hy. Edw."; consequently the real female specimens which have been thought to have been *amorphæ* have in reality up until the present time been without a name. So I am calling them form ♀ *masumbrosus,* meaning "male shadow," and am designating the holotype as the specimen which has lain in the Edwards' collection for years and which has been mistaken for its female, though Hy. Edwards never gave it that connection or evidently thought of describing it. I wish to thank Mr. Watson for assisting me to establish the identity of synonym *amorphæ*.

Zerene eurydice Bdv. **lineainita,** form ♂ nov.

Typical ♂ *eurydice* Bdv. has immaculate secondaries, free of any black design. Form ♂ *bernardino* Edw. has a black band at outer margin on secondaries which in some specimens is represented only by a thick line and in others by quite a broad marginal edge. This new form has no black band, but a series

of black streaks extending inward from the outer margin on each of the veins and nervules. These thin streaks are more noticeable nearer the costa where they extend inward about one-quarter the width of the wing. The under sides are as in typical ♂ *eurydice*.

Data: Holotype ♂, shown on plate No. 1; expanse, 54 mm.; San Bernardino mountains, California, July 3, 1924; in author's collection.

Zerene cæsonia Stoll, **immaculsecunda,** form ♀ nov.

Primaries: with greatly reduced black markings; outline of "dog face" not clear-cut, having outline at "forehead" incomplete. Secondaries: immaculate of all usual marginal designs, cell blotch remaining as usual. Wings beneath as in typical *cæsonia,* yet not over ruddy.

Data: Holotype ♀, shown on plate 2; expanse, 62 mm.; **Pinery Canyon, Arizona** (Kusche), September 23, 1927; in author's collection. One paratype ♀, shown on plate 2; expanse, 55 mm.; Willard, Missouri (Brower), September 27, 1917; in collection of Mr. A. E. Brower, Willard, Missouri.

Note: Seitz pictures what he evidently considers *helena* Reak. from Bolivia, South America. His ♀ looks something like the above-described form.

Check List Revision for United States species of Genus Zerene Hbn. (See classification scale, *Entomological News,* November, 1927.)

Old Listing (By Barnes and Benjamin)	New Listing (Now proposed)
Zerene Hbn.	Zerene Hbn.
56. eurydice Bdv.	—. eurydice Bdv.
♂ *wosnesenskii* (Men.)	♂ *wosnesenskii* (Men.)
♀ *lorquini* (Bdv.)	♀ *lorquini* (Bdv.)
♀ *helena* (Reak.)	♀ *helena* (Reak.)
ab. fanniæ Gunder	♂ *amorphæ* (Hy. Edw.)
gen. æst. amorphæ (Edw.)	*f.* ♂ bernardino (Edw.)
a. bernardino (Edw.)	*f.* ♂ lineainita Gunder
ab. newcombi Gunder	*f.* ♀ masumbrosus Gunder
57. cæsonia (Stoll)	*tr. f.* fanniæ Gunder
*caroliniana (Petiver) (pre-Linn.)	*tr. f.* newcombi Gunder
gen. autum. rosa (M'Neill)	—. cæsonia (Stoll.)
form rosæ (Roeber)	*f.* rosæ (Roeber)
	f. vern. rosa (M'Neill)
	f. immaculsecunda Gunder

A NEW STICTIELLA FROM TEXAS (HYMENOPTERA, BEMBECIDÆ)

BY CHARLES L. FOX
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Stictiella terlinguæ C. L. Fox, new species

In Parker's key the male runs to *megacera* and the female to *tenuicornis,* both sexes differing from these species by fasciæ on tergites broken into discal and lateral spots and many other characters, including, in the male the eighth sternite with prominent discal spine, wanting in *megacera,* and in the female the scape shorter and stouter, pubescence on clypeus and face not silvery as in *tenuicornis.* Length, 16 to 17 mm.

Male. Labrum short and broad, roundedly truncate at apex; clypeus strongly convex; prominent longitudinal carina between the antennæ; scape normal; flagellum cylindrical, long, slender, segments 2 to 4 almost equal in length, the second being a trifle the longer, 6 to 11 with inner apical angle slightly produced; ultimate segment slightly curved and somewhat flattened apically; inner margins of compound eyes almost parallel. Legs long and slender; middle femora smooth below; metatarsi normal, slender; pulvilli large and distinct. Wings hyaline, short, about two and a half times as long as the breadth of thorax; veins almost black; second cubital cell on top almost as wide as below; first cubital cross-vein slightly bent near junction with cubitus. Pubescence moderately long and sparse on head and thorax, short yet quite evident on tergites and sternites. Second sternite bearing a short pointed, median, somewhat hirsute tubercle; eighth sternite ending in three curved spines of which the central longer one has, arising from its base beneath, a prominent fourth spine, which is stout, pointed and obliquely directed backward. Genital stipites long and narrow.

Color black with the following pale yellow or yellowish white maculations: mandibles, except apices; clypeus, except minute posterior lateral spots; frons, except median butterfly-shaped spot connected laterally with black of vertex; broad anterior orbits narrowed to a point above; posterior orbits, broad below, very narrow above and reaching vertex; posterior border of pronotum and sides of prothorax except dusky line in front of tubercles; tegulæ almost entirely; lateral lines, a pair of narrow discal lines and a small posterior marginal discal spot on scutum; fascia on scutellum, narrowed medially; metanotum almost entirely; indistinct fascia on dorsum of median segment (on one paratype broad medially) and sides of same; meta-

pleuræ, mesopleuræ almost entirely, mesosternum except one medial spot in front of middle coxæ; fasciæ on tergites one to six broken with large rectangular lateral spots and a pair of ellipsoidal medial spots; apex of ultimate tergite; first sternite except lateral basal spots, second except small medial spot, continuous broad fasciæ on three to six, emarginate, more or less, medially and laterally; coxæ and trochanters in part, femora and tibiæ except stripes above, and tarsi. Scape rubescent, flagellum black above, rufous below. Dorsal marking of tergites pale yellowish white.

Female. Head, thorax and abdomen broader, and flagellum and legs stouter than in the male, but pulvilli as distinct. Anterior tarsal combs strongly developed; ultimate tergite with few coarse shallow punctures and stout spines on lateral basal borders; pubescence similar to that on male.

Color black with the following rich yellow maculations: labrum; mandibles, except apices; clypeus, except small indistinct basal lateral spots; scape; frons, except large butterfly-shaped spot on middle, connected laterally with black of vertex; broad anterior orbits; posterior orbits, broad below, gradually narrowed above, very narrowly connected across vertex; posterior discal border of pronotum, sides of prothorax; tegulæ; broad lateral lines and U-shaped discal mark on scutum; broad fascia, narrowed medially, on scutellum; metanotum almost entirely; broad curved fascia on dorsum of median segment, lateral angles and sides of same; metapleuræ; mesopleuræ almost entirely; mesosternum with small black round discal lateral spots; fasciæ on tergites one to four, broken into large rectangular lateral spots, and a pair of large ellipsoidal medial spots; fascia on tergite five sharply bisinuate on anterior border and deeply notched on posterior border; ultimate tergite, except notched anterior border; first and second sternites entirely; third, except emarginate somewhat on anterior margin; fourth and fifth bisinuate on anterior border and deeply notched on posterior border; ultimate tergite, except notched anterior border; first and second sternites entirely; third, except emarginate somewhat on anterior margin; fourth and fifth with broad fasciæ, narrowed medially; ultimate sternite, except very narrow broken longitudinal line on middorsal area connected with narrow emarginate basal margin and apex; coxæ; trochanters in part; femora and tibiæ with stripes above tarsi. Underside of flagellum yellow, changing to rufous toward the apex. Described from three males and three females.

Type, male, No. 2474, and *allotype,* female, No. 2475, Mus. Calif. Acad. Sci., collected by J. O. Martin, May 6, 1927, at Terlingua, Texas. *Paratypes* same data in collection of the California Academy of Sciences.

NOTES AND DESCRIPTIONS OF NEW SPECIES OF LUCANIDÆ AND CERAMBYCIDÆ (COLEOPTERA) FROM WESTERN NORTH AMERICA

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LUCANIDÆ

Platycerus Geof.

The genus *Platycerus* is in the main Holarctic, with the bulk of its species in North America, particularly on the Pacific Coast. During recent years a number of new forms have been described from this country which careful field observations and larger series than were formerly available have shown to have unequal standings. Some are without doubt very distinct species, others geographical races or subspecies, while many are nothing more than mere individual variations or even absolute synonyms. I am now convinced that there are not more than nine good species, even including the one which I will add. The following table, descriptions and notes will, I hope, show this.

SYNOPTIC KEY

1. Antennal club composed of four unilaterally dilated segments, males with larger heads and much larger mandibles than females 2
—. Antennal club composed of but three unilaterally dilated segments, males with mandibles hardly larger than those of females 4
2. Seventh antennal segment of male almost as large as eighth, mandibles of males with large tubercle on outer side near base, the sides almost straight and convergent, with numerous teeth on inner face near apex, color black or with but a faint bronzing of the elytra ..... *depressus* Lec.
—. Seventh antennal segment of male much smaller than eighth, mandibles of males ending in three cusps and without teeth on inner edge near apex, upper surface somewhat bluish, greenish or bronzed 3
3. Male mandibles obliquely sinuate on outer margin, head and pronotum rather closely punctured, pronotum without longitudinal impression at middle, lateral margins quite wide, color of upper surface variable, bluish, greenish or bronzed ..... *quercus* Web.
—. Male mandibles to a great extent arcuate on outer margin, head and pronotum not closely punctured, pronotum with

evident longitudinal impression at middle, lateral margins rather narrow, species normally much larger than preceding, head and pronotum black, faintly bronzed at most, elytra blue or somewhat greenish.....*oregonensis* Westw.

4. Males more elongate, parallel and less convex than females, club of antennæ as long or longer than funicle, middle and hind tibiæ long and narrow, armed with but few sharp teeth..... 5

—. Males robust like females, club of antennæ shorter than funicle, middle and hind tibiæ very robust and heavily armed with series of short spines..... 9

5. Species either rufous or somewhat piceous and generally with a pronounced bronze luster, elytra with definitely impressed striæ or striate arrangement of punctures..... 6

—. Species piceous or black and with the faintest trace of bronzing at most, elytra with striæ not clearly defined..... 8

6. Sides of prothorax sinuate behind and hind angles right-angled, genæ hardly more prominent than eyes, prothorax with lateral margin of moderate width, disk closely punctured, especially at sides, elytra with striæ always well impressed, color rufopiceous with marked bronze luster.....*agassizi* Lec.

—. Sides of prothorax oblique or hardly sinuate behind, with hind angles obtuse; lateral margins broad, disk not very closely punctured even at sides..... 7

7. Upper surface with a definite æneous luster, genæ not more prominent than eyes, anterior margin of prothorax slightly emarginate; strial punctures of elytra more prominent than interstrial, disk quite convex even in males.....*æneus* sp. nov.

—. Upper surface rufocastaneous on rufopiceous (females), without marked bronze luster, genæ decidedly more prominent than eyes, head in front of eyes wedge-shaped, anterior margin of prothorax rather deeply emarginate, strial punctures of elytra not more prominent than interstrial, the elytral punctuation thus somewhat confused, males quite flat and with very broad margins to prothorax.....*laticollis* Casey

8. Sides of prothorax broadly, rather evenly arcuate, strongly sinuate behind, with hind angles right or acute, side margin decidedly reflexed; head and pronotum coarsely, closely punctured, pronotum less closely in females; elytra coarsely and quite irregularly punctured, the strial and interstrial punctuation not readily separable; color piceous.....*latus* Fall

—. Sides of prothorax in front oblique, divergent behind and hardly arcuate to well behind middle, then broadly rounded and sinuate to hind angles which are right or acute; head coarsely, closely punctured, pronotum more finely; elytra very finely, irregularly and not closely, especially in females; strial arrangement of punctures only evident here and there; color dull black.....*opacus* Fall

9. Sides of prothorax broadly rounded at middle, oblique in front and behind or the latter slightly sinuate, with hind angles obtuse, side margin very narrow; elytra with strial arrangement well indicated, the alternate intervals slightly elevated, punctures rather numerous and but moderately coarse, color rufopiceous or piceous and not bronzed.....*keeni* Casey

PLATYCERUS DEPRESSUS Lec.

This is the most northern of our species and the one with the greatest longitudinal range. The western phase lives in old rotting aspen logs, *Populus tremuloides* Michs. The typical form, black with somewhat bronzed elytra, extends from Nova Scotia and northern New England to the Lake Superior region. The subspecies *marginalis* Casey, black without bronze luster, larger, broader, with the elytral striæ finer and the punctuation less deep than the other, ranges throughout the entire Rocky mountain region including the Wasatch Mountains of Utah and the high Cascade and Sierra Nevada mountains. A second subspecies which I will now describe has recently been found.

Platycerus depressus cribripennis Van Dyke
new subspecies

Dull black, almost subopaque. Head broad in male, coarsely, deeply punctured, genæ prominent, subangulate at apex, with narrow margins; male mandibles with the outer basal tooth acute and upturned. Prothorax in general similar to typical form and *marginalis* but with hind angles sharply rectangular and lateral margins narrow. Elytra with humeral tooth lacking and the surface coarsely, deeply, closely, and cribrately punctured, with neither striæ nor intervals defined. Male, length 12.5 mm., breadth 4.5 mm.; female, length 12 mm., breadth 5 mm.

The females as usual have smaller heads and narrower prothorax than the males, with more closely punctured heads and slightly broader elytra.

Holotype, male, No. 2533, and *allotype,* No. 2534, Mus. Calif. Acad. Sci., and one *paratype* in the Slevin collection of the California Academy of Sciences. All three specimens were collected by Mr. L. S. Slevin at **Tassajara, Monterey County, California,** the holotype, May 25, the others May 21, 1920. The male was found on an alder log.

This insect is so distinct superficially because of its subopaqueness, coarse and cribrate type of elytral punctuation, narrower thoracic margins, and other minor features, that one

would almost be justified in considering it a good species. It, however, possesses the characteristic facies and fundamental characters which are so distinctive of *depressus* and its closer subspecies *marginalis*. In view of this, and knowing how greatly the various races of other Lucanidæ vary as to surface sculpturing, I feel that it is better to place it as a subspecies.

PLATYCERUS QUERCUS Web.

A widely distributed species throughout the region east of the Mississippi River and quite variable, especially as to color. The so-called varieties *angustus* Casey and *iowanus* Casey are so poorly defined that I think them hardly worth recognizing. They should be placed with *securidens* Say and ? *virescens* (Fab.) as synonyms.

PLATYCERUS OREGONENSIS Westw.

This is in many ways but a larger relative of *quercus*, replacing it on the Pacific Coast where it is widely distributed from British Columbia to southern California. The typical form with a distinctive bluish color breeds in the rotting trunks of a number of our softwood trees such as alder and California laurel, *Umbellularia californica* Nutt. and the introduced Australian blue gum, *Eucalyptus globulus* Labill., and like most of its larger relatives varies greatly in size and shape. Along the sea beaches of the Oregon coast there is a phase which generally lacks the bluish color, being as a rule black with a slight greenish luster. The mandibles of the males also appear to be more horizontal, less elevated at the apex, than in typical forms. It, however, gradually grades into the typical form. *Cærulescens* Lec. and *chalybæus* Casey are absolute synonyms.

PLATYCERUS AGASSIZI Lec.

This is a coastal species ranging from just south of San Francisco to middle Oregon. It breeds in several species of oak, madrone, *Arbutus menzesii* Pursh., and so forth, and varies in appearance slightly as regards the males and greatly as regards the females, some of the latter being twice normal size and much more rugose. In the northern part of its range, subspecies replace the typical form. The most frequent of these is *pacificus* Casey of which *californicus* Casey is the female and *peregrinus* Casey, a synonym, a very weak race differing as

regards the male in being somewhat smoother and the female less rugose, with the elytra more distinctly striate. The subspecies *parvicollis* Casey is a fairly distinct subspecies, at least as regards the male which is evidently narrower and more elongate than typical *agassizi* and, as indicated by its name, with a smaller prothorax. *Pacificus* ranges from northern Mendocino County, California, to about Coos Bay, Oregon, while *parvicollis* seems to be limited to Humboldt Bay, California.

Platycerus æneus Van Dyke, new species

Elongate, elliptical, moderately convex, shining, rufopiceous with a pronounced æneous luster, the legs quite rufous. Head with front flattened, coarsely, irregularly and rather closely punctured, with a few semierect hairs, and the usual smooth oblique ridges in front of the eyes; clypeus slightly emarginate in front and depressed, sides oblique, galea lobed and hardly more prominent than eyes; mandibles but moderately prominent, with a blunt tooth near middle of inner margin; antennæ with segments 3 to 7 slightly but gradually increasing in breadth, 8 to 10 broadly unilaterally dilated forming the usual loose club which is slightly longer than funicle, 8 to 9 twice as broad as long, the tenth somewhat pentagonal. Prothorax 1.5 mm. broader than long; sides broadest slightly behind middle, a bit arcuate in front, oblique and but faintly sinuately convergent to obtuse hind angles; base just perceptibly arcuate; side margins broad and considerably reflexed; disk rather coarsely, irregularly and somewhat closely punctured, especially at sides, a longitudinal smooth area at middle, with a faintly impressed line posteriorly. Elytra not quite a third longer than broad, with humeri well rounded, vaguely dentate at most, the sides slightly widened to beyond middle then evenly arcuate to apical angles, the margins quite broad and reflexed, especially posteriorly; disk with striæ finely impressed, in most places indicated only by the moderate-sized, rather closely placed punctures; intervals flattened and irregularly punctured with well-spaced punctures. Beneath rather coarsely, regularly and quite closely punctured. Legs long and delicate, front tibiæ distinctly serrate outwardly as usual, middle and hind tibiæ slender, the tarsi long, about equal in length to tibiæ. Length 10 mm., breadth 4.25 mm.

Female generally shorter, broader, more convex and generally robust, more rufous, with æneous luster less pronounced. Head smaller, sides in front more evenly arcuate, mandibles smaller; antennæ shorter, the club smaller and not longer than funicle. Prothorax longer and narrower, with sides quite broadly and evenly arcuate, side margins narrower, the disk more convex. Elytra elliptical, quite convex, the strial punctuation more regular and the punctuation of intervals finer and sparser. Legs shorter and stouter as

usual, the femora and tibiæ especially so. Length 9.5 mm., breadth 4.5 mm.

Holotype, male, No. 2535, and *allotype,* female, No. 2536, Mus. Calif. Acad. Sci., and several designated *paratypes* from a series of nine specimens collected by myself at Cannon Beach, Clatsop County, Oregon, during June, 1927; the holotype, June 18, the allotype, June 9. Other specimens studied in the collection of the California Academy of Sciences are: two females from Forks, Clallam Co., Wash., collected by Mrs. Helen Van Duzee, July 1, 1920; two males from Hoquiam, Wash., May 27, 1914, and two males from Humptulips, Wash., May 28 and 29, 1914, collected by myself; as well as one male from Tillamook, Ore., July 5-6, 1911, collected by Mr. J. R. Slevin. These are all from the extreme coastal or wet belt of western Washington and northwestern Oregon.

This species is a very distinct one, belonging in the *agassizi* group, in some ways like *Platycerus agassizi* Lec. itself, in other respects more like *laticollis* Casey. From the former and more southern species *æneus* differs by being slightly smaller and shorter, the surface smoother and more shining with an æneous or greenish bronze luster much like that of the cerambycid, *Phymatodes æneus* Lec., the upper surface not so coarsely nor so densely punctured, the elytral intervals never elevated or convex as they are in *agassizi*; the antennal club less developed; the prothorax not so long, the sides not markedly sinuate posteriorly and with hind angles sharply right-angled as in *agassizi,* but the sides oblique and hind angles obtuse with the side margins broader and more broadly reflexed. *Platycerus laticollis* Casey differs from *æneus* by being flatter, with very much broader and flatter elytral margins, by having a heavier antennal club, genæ more prominent than eyes and by being much more rufous and lacking the evident æneous luster.

PLATYCERUS LATICOLLIS Casey

Like *æneus* a well-marked species. It is apparently limited to the coastal mountains west of Corvallis, Oregon, and extends along the coast from Marshfield (Coos Bay) to Newport.

PLATYCERUS LATUS Fall and PLATYCERUS OPACUS Fall

These are two very distinct species, undoubtedly offshoots of the *agassizi* stock and like it having the prothorax very sinuate

behind and with right or acute hind angles. The former is confined to the foothills of the middle Sierra Nevada, Placer and El Dorado counties, and the latter to the more southern Sierra, Tulare and Fresno counties.

PLATYCERUS KEENI Casey

This was described from specimens found on the northern Queen Charlotte Islands, and *Platycerus thoracicus* Casey, from specimens taken on Humboldt Bay, California. Typical specimens of the latter, I have studied from the type locality and I have also taken a good series from Waldport and Cannon Beach, Oregon. The larger specimens of this species, for it may be 12 mm. or over in length and very robust, might be separated from *keeni* by their size and robustness, but the smaller specimens, when carefully compared with typical *keeni* from the type lot, absolutely cannot be separated either by size, appearance or by any character. I am, therefore, reducing the name *thoracicus* Casey to synonymy. *Pedicellaris* Moll. is, of course, also a synonym. *Keeni,* which shows its ancestral connection with *æneus* and *laticollis* by its obtuse prothoracic angles, is one of the most peculiar and distinct in our fauna, being provided with heavy fossorial legs, differs hardly at all as between the sexes, and is confined to the sea-coast sand dunes where it breeds in the old alder and poplar logs which have been cast up by the storms It has not yet been taken on the Washington nor on the Vancouver Island coast, but no doubt will be.

CERAMBYCIDÆ

Callidium pallidum Van Dyke, new species

Moderately large, robust, broad, rufotestaceous, elytra somewhat lighter; sparsely clothed with long erect pile, the elytra excepted, but for a few hairs at base. Head two-thirds breadth of prothorax, coarsely, closely and shallowly punctured, triangulately sulcate between antennæ; clypeus deeply, triangularly impressed; eyes distinctly smaller than in *antennatum*; antennæ robust, almost reaching apex of elytra, basal segment robust and strongly clavate, 2 to 4 definitely enlarged apically, second about one and a half times as long as wide, third slightly more than three times as long as broad and twice length of second. Prothorax more than one-third broader than long and one-fourth shorter than base of elytra, broadest well in front of middle; sides broadly arcuate in front, oblique and convergent behind; disk somewhat flattened above, without the amphora-like depression seen in *antennatum,* punctured like head, the base

deeply and completely margined. Elytra twice as long as broad, broadest back of humeri, narrowed apically, humeri prominent; sides slightly arcuate in front, thence broadly slightly emarginate to rounded apices; disk much flattened, coarsely, rather deeply and irregularly reticulate, two distinct and elevated longitudinal lines in paratype but not in holotype. Abdomen beneath finely, sparsely punctured, with well-marked impressions near margins of each segment, the pubescence finer and less erect than anteriorly. Legs very markedly and suddenly clavate, the dilated portions expanded transversely as well as laterally. Length 11 mm., breadth 4.5 mm.; paratype, length 14 mm., breadth 6 mm.

Holotype, No. 2537, Mus. Calif. Acad. Sci., collected by Mr. L. S. Slevin at Arbolado (mouth of Big Sur River), California, May 13, 1913, and one *paratype* from La Honda, southern San Mateo County, California, taken from California redwood, *Sequoia sempervirens* Endl., on December 15, 1922, by a Mr. Gladstone, and donated to the California Academy of Sciences by Dr. H. E. Burke.

This light-colored and very robust species I have long known through the holotype which was submitted to me some years ago by Mr. Slevin. At first it was believed to be immature, and it was not until I saw the second specimen that I realized my mistake. It is readily separated from all of our larger species by its color, robustness, hairiness, the robust antennæ with basal segments all slightly clavate, the decidedly clavate legs and the cribrate elytra.

Callidium hardyi Van Dyke, new species

Narrow, elongate, subparallel, black, slightly shining, punctate rugose and clothed with a short, fine suberect cinereous pile. Head three-eighths breadth of prothorax, eyes hardly projecting beyond the parallel sides, occiput moderately coarsely and closely punctured, clypeus deeply triangularly impressed; antennæ reaching to last quarter of elytra, basal segment clavate, second small, third about five times as long as broad, the following gradually shorter and broader. Prothorax considerably narrower than base of elytra, almost quadrate, as long as broad, sides barely arcuate and narrowed behind, disk slightly convex and closely, rather coarsely punctured, with three small somewhat triangularly disposed callosities. Elytra almost three times as long as broad, sides straight, almost parallel, disk flattened, very coarsely, closely punctured and somewhat transversely rugose. Beneath rather coarsely, shallowly punctured in front, finely and sparsely on abdomen. Length 8.5 mm., breadth 2.5 mm.

Holotype, No. 2538, Mus. Calif. Acad. Sci., and four *paratypes,* taken from Douglas fir, *Pseudotsuga taxifolia* Britt. at

Garden Head, British Columbia, one of the paratypes, April 12, 1897, the others May 30, 1927. They were collected by Mr. George A. Hardy of the Provincial Museum of Natural History at Victoria, British Columbia, after whom I take great pleasure in naming it. One of the specimens differs by having the prothorax reddish yellow except for a discal and sternal black spot, and the bases of the front femora also reddish yellow.

This species has for some time been confused with *Callidium vile* Lec. which it greatly resembles and which likewise breeds in the Douglas fir, but it is very much larger, one-third longer, with eyes slightly more prominent and head more exposed (the head in *vile* generally greatly retracted); the antennæ much longer and narrower (in *vile* about reaching middle of elytra and with third segment never longer than four times breadth, the following also shorter than is the case in *hardyi*), the prothorax longer and narrower (in *vile* broader than long and almost equal in breadth to base of elytra), and the elytra having a well-defined punctuation, whereas this is to a great extent obliterated by the running together of the pits with a greater development of rugoseness in the other. This species might possibly be confused with the black phase of *Callidium hirtellum* Lec., but this latter is restricted to pines, is shorter and broader, more densely pilose, with a different type of antennæ, and otherwise is quite diverse.

MELANOPHILA CONSPUTA Lec.

This well-known buprestid is attracted in great numbers not only to recently scorched forest trees and to the neighborhood of lumber mills where there is burning slash and sawdust, but to burning petroleum (see Pan-Pac. Ent. III, 1926, p. 41), and sugar mills. During the hot days preceding October 12, 1927, great numbers of these were observed about the Western Sugar Refinery in San Francisco. They seemed to congregate about the vats and other places where the hot sugar or syrup was. The authorities of this plant tell me that this is of frequent occurrence during the hot spells of late summer and autumn.—Edwin C. Van Dyke.

A SHORT REVIEW OF THE TRIBES ORSODACNINI AND CRIOCERINI OF THE COLEOPTEROUS FAMILY CHRYSOMELIDÆ WITH SPECIAL REFERENCE TO SPECIES OF WESTERN UNITED STATES

BY HAROLD R. BRISLEY

(Continued from page 60)

Genus Zeugophora Kunze

The genus is sufficiently characterized in the key to enable it to be distinguished from other genera in the tribe. It is composed of seven North American species, five of which occur west of the Rocky Mountains.

Key to the Western Species of the Genus Zeugophora Kunze

A. Body above entirely black.....1. *abnormis* Lec.
AA. Body above entirely testaceous or bicolored.
B. Elytra black; prothorax orange.
C. Lateral margins of prothorax above the tubercles narrowing slightly to apical angles.....
2. *scutellaris* Suffr.
CC. Lateral margins of prothorax above the tubercles straight to apical angles.....3. *neomexicana* Schffr.
BB. Elytra testaceous or bicolored.
D. Prothorax entirely orange; at least the basal half of the sutural margin of elytra black.....
4. *californica* Cr.
DD. Prothorax bicolored or entirely testaceous; at least the basal half of the sutural margin of the elytra yellow.....5. *varians* Cr.

Zeugophora abnormis (Lec.)

This species needs no further characterization than that given in the key. It is the only species of the genus with the body, above and below, black. Specimens have been taken from near Lake Superior, New Mexico, Colorado, Washington, and California.

Zeugophora varians Cr.

Elongate-oblong, subconvex. Top of head and disk of prothorax reddish yellow to black, the latter usually with a yellow median stripe which widens on basal half; elytra usually piceous with a long oval or heart-shaped yellowish spot on center of disk; front of head, antennæ, legs and prosternum dull reddish

yellow. Prothorax with an obtuse lateral spine; entire body sparingly pubescent. Length, 3 mm.

The color as given above is subject to great variation. Specimens occur which are entirely ferrugineous and without trace of black. When the prothoracic disk is black it is often divided in half by a yellow median line. The testaceous and ferrugineous individuals are more common in western collections than the typical *Z. varians,* which is largely black.

Specimens have been taken in Pennsylvania, Massachusetts, Michigan, Illinois, Indiana, Washington, and California. They are generally taken from the foliage of poplar.

ZEUGOPHORA SCUTELLARIS Suffr.

This species may be distinguished from all others of the genus, with the exception of *Z. neomexicana,* by the color of the elytra as given in the key. It closely resembles the recently described *Z. neomexicana* Schffr. It can, however, be separated from that species by its shorter length and by the oblique lateral margins of the prothorax above the tubercles, which in *Z. neomexicana* is straight to the apical angles.

Specimens have been taken in Illinois, Indiana, Michigan, New Mexico, Washington, and Oregon. They are quite rare in collections.

ZEUGOPHORA NEOMEXICANA Schffr.

This species was described in 1919 from Santa Fé, New Mexico. According to its author it differs from *Z. scutellaris* by being a little longer, and by the lateral margin of the prothorax above the tubercles being straight to the apical angles, instead of oblique. *Z. neomexicana* can readily be distinguished from the other members of the genus by the black elytra and orange prothorax.

ZEUGOPHORA CALIFORNICA Cr.

This species is quite rare in collections. It may be distinguished from *Z. varians* by the color characters given in the key. From *Z. scutellaris* and *Z. neomexicana* it is clearly separated by the testaceous or bicolored elytra. It inhabits Oregon and California, and is generally taken from the foliage of willow.

Tribe Criocerini

LeConte and Horn in 1883 [7] state that the distinction between this and the tribe Orsodacnini is feeble and based only on the greater length of the first ventral segment and the different shape of the claws. The facies of the species composing these two tribes are to my notion quite distinct, the difficulty lies in finding definite divisional characters. To the characters mentioned by the above named authors can also be added the deep V-shaped groove of the vertex. This is entirely absent in the preceding tribe, but is pronounced in all the species of Criocerini which I have examined.

This tribe has been much neglected by systematic workers, probably because more than half the species are extremely rare in collections. The only attempt at a revision of the North American species was made by G. R. Crotch in 1873.[8] In this paper he covers only twelve species of the genus *Lema*. Since the date of his paper there have been fourteen additional species described, most of which inhabit western United States.

The tribe is composed of only two genera, both of which are represented by species in western United States. To the single point given by LeConte and Horn for separation of the genera, I have added the character which appears in the key concerning the shape of the tarsal claws. In both genera the claws are of the divergent type, but in the genus *Crioceris* they are contiguous nearly at the base (Fig. 5), while in the genus *Lema* they touch for at least a third of their length (Fig. 4).

Key to the Genera of the Tribe Criocerini

A. Prothorax constricted at middle; tarsal claws contiguous for at least the basal third (Fig. 4).....2. *Lema* Fab.

AA. Prothorax cylindrical; tarsal claws separated and contiguous for less than basal third (Fig. 5).....1. *Crioceris* Geoff.

Genus Crioceris Geoff.

To this genus belongs two species, both of which feed on asparagus. The true asparagus beetle *C. asparagi* (L) occurs in California. *C. duodecimpunctata* (L) has never been taken in western United States.

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7 "Classification of the Coleoptera of North America." Smith. Misc. Coll., Vol. 26, 1883.

8 Proc. Acad. Nat. Sci. Phila., Vol. 25, 1873, pp. 19-83.

CRIOCERIS ASPARAGI (L)

Body elongate; head, under surface of body, femora, elytral unbones and a wide sutural stripe on the elytra, which widens at the middle and sometimes at the base, bluish-green; prothorax and elytra varying from yellow to reddish, the prothorax often with two bluish or greenish spots on the disk; antennæ from the fifth segment outward black. Length, 7 mm.

Genus LEMA Fabr.

The California Academy of Sciences has probably as great a number of species of the genus *Lema* as any single collection in the country. The following table to the western species of the genus, founded upon that collection, should prove valuable, as there is no adequate guide to the species in the literature at this time. The table is based on color, which is the best divisional character available. It will be found to be accurate, at least as regards typical species, and for any variation from the typical either noted in literature or evinced by the series which I have examined.

KEY TO THE WESTERN SPECIES OF THE GENUS LEMA Fabr.

A. Elytra with the ninth stria interrupted.
  B. Antennæ and legs pale.....*æmula* Horn
  BB. Antennæ and legs piceous or black.....*sexpunctata* Oliv.
AA. Elytra with the ninth stria entire.
  C. Elytra unicolorus.
    D. Prothorax black.
      E. Sides of prothorax broadly rounded in front of the abrupt prothoracic constriction.....*peninsulæ* Cr.
      EE. Sides of prothorax not broadly rounded; prothoracic constriction less abrupt.....*concolor* Lec.
    DD. Prothorax red.
      F. Abdomen red.
        G. First segment of antennæ and scutellum red.....*arizonæ* Schffr.
        GG. First segment of antennæ and scutellum black.....*cornuta* Lac.
      FF. Abdomen black.
        H. Head red.....*coloradensis* Linnell
        HH. Head, at least in part, black.
          I. Scutellum elongate, subtriangular, with apex rounded; elytra two and one-half times as long as broad. *longipennis* Linnell

II. Scutellum semi-oval, truncate at apex, elytra not more than twice as long as broad..... *collaris* Say

CC. Elytra bicolored.

J. Elytra blue, with transverse band at middle yellow or red. *balteata* Lec.

JJ. Elytra without transverse yellow band at middle.

K. Elytral disk without vitta, the sutural interval alone being black..... *flavida* Horn

KK. Elytral disk at least in part black.

L. Submarginal vitta between the sixth and eighth rows of punctures..... *notativentris* Schffr.

LL. Submarginal vitta touching the tenth row of punctures (in *confusa* this vitta is sometimes exaggerated in width so as to cover the disk of the elytra, excepting the basal fourth).

M. Submarginal vitta abbreviated at apex and base. *confusa* Chev.

MM. Submarginal vitta reaching the base..... *trilineata* Oliv., sub sp. *nigrovittata* Guer.

Lema trilineata nigrovittata Guer.

For several years there has been a doubt in my mind as to the validity of the two species *L. trilineata* and *L. nigrovittata.* After a thorough study of a large series of these two species, collected not only in the eastern United States (the typical locality of *L. trilineata*) and California (the typical locality of *L. nigrovittata,* but also through Arizona and Utah, where the two species as described intermingle, I am convinced that

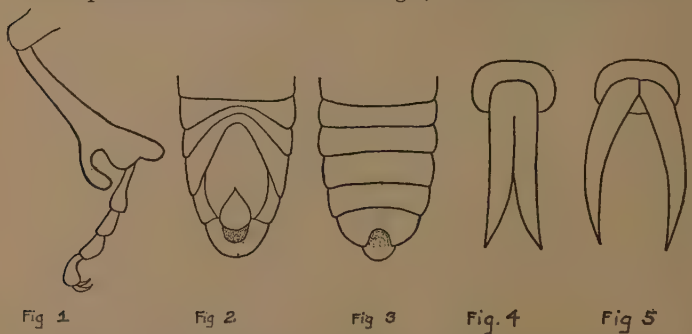

Fig. 1. *Syneta hamata* Horn male, posterior tibia;
Fig. 2. *Tricolema anomala* Cr. male, ventral abdominal segments;
Fig. 3. *Tricolema anomala* Cr. female, ventral abdominal segments;
Fig. 4. *Lema trilineata* Oliv., tarsal claws;
Fig. 5. *Crioceris asparagi* (L), tarsal claws.

L. nigrovittata should be reduced to a subspecies of *L. trilineata.* Color is the only character which serves to separate the typical forms. In a series of 100 specimens I find that 20 per cent have the typical color of *L. trilineata,* 23 per cent the typical color of *L. nigrovittata* and 57 per cent come intermediate between the two. Typical *L. trilineata* extends west into the desert regions of Arizona and California. Typical *L. nigrovittata* is found only in California, and the intermediates are mainly distributed in the regions of Arizona and California where the typical localities overlap. This conclusion is decidedly strengthened by the observation that Jimson weed (Datura) is the native breeding plant for both species.

CONCERNING KIRKALDY'S *NOTONECTA MEXICANA* VARIETIES *HADES* AND *CERES*

(Hemiptera-Notonectidæ)

BY H. B. HUNGERFORD

University of Kansas, Lawrence, Kansas

In a paper [1] published two or three years ago I reported that in Kirkaldy's collection all of his *Notonecta mexicana* var. *hades* are males and all of his variety *ceres* are females. The typical specimens of the variety *hades* are nearly black and the *ceres* always with scutellum and membrane of hemelytra black and other parts of wing red, or some lighter color grading to horn. The anterior lateral margins of the prothorax in the *ceres* are much flattened and explanate, which is not true for the *hades* forms. This fact when coupled with the very different color pattern of the two would make one hesitate to consider them a single species. However, through the kind assistance of my friend, Mr. R. A. Stirton, a former Kansas University man, I am able to settle the question definitely. Mr. Stirton has made two trips [2] into Central America on biological survey work and, while all of his time was concerned with the strenuous demands of his duties in connection with the collection of vertebrate forms, he managed to remember me and each time captured in passing a few aquatics. When he returned from his

1 "Canadian Entomologist," Vol. LVII, p. 238.
2 Donald R. Dickey Expedition, July, 1925, to May, 1926, inclusive, and November, 1926, to July, 1927, inclusive.

first trip he brought me three specimens of a back-swimmer, one black male and two red and black females. These specimens were Kirkaldy's *Notonecta mexicana* var. *hades* and *ceres*, respectively. I therefore asked him as a special favor to collect mating pairs, if he should have the good fortune to collect in the region again. As a result I have before me five pairs of these forms taken in copula by Mr. Stirton and in addition eleven other adult specimens and four nymphs. The data are as follows: From San Jose del Sacare, Dept. Chalatenango El Salvador, C. A., March 13, 1927, altitude 3600 feet, by R. A. Stirton; three pairs in copula and six males and one female. From the same place, but on March 11, one pair in copula and a male. From Los Esesmiles, Dept. Chalatenango, El Salvador, C. A., March 1, 1927, altitude 7000 feet, by R. A. Stirton; one pair in copula and three females and four nymphs.

The males in every case are typical *hades* and the females *ceres*. In the last-mentioned pair the female has the horn color in place of the red, which is a common enough occurrence among the *N. mexicana* series. The name *hades* is a synonym of *ceres*. The species appears to be the commonest back-swimmer in Costa Rica, and I have specimens from Mexico, Guatemala, and Panama. I have seen no specimens from the United States, and believe the *Notonecta lobata* described by me from the Southwest has been mistaken for it.

ON THE DISTRIBUTION OF PERIZOMA OSCULATA HULST (LEPID., GEOMETRIDÆ)

BY WILLIAM BARNES AND F. H. BENJAMIN
Decatur, Illinois

PERIZOMA OSCULATA Hlst.

1896, Hulst, Trans. Am. Ent. Soc., XXIII, 281, *Euchoria.*

This species was described from "Southern California." There is an example in the Barnes collection bearing a printed label "So. California. Collected by H. K. Morrison."

Three other examples have been received from the Oberthür collection. All bear hand-written data, two being labeled "Montana Morrison 1881," and the other, "Washington Territory" in what appears to be Morrison's handwriting.

The correct locality for this species would appear to be questionable.

BEES BELONGING TO THE FAMILY BREMIDÆ TAKEN IN WESTERN OREGON, WITH NOTES

BY H. A. SCULLEN

(Continued from page 76)

18. BREMUS FRIGIDUS (Smith)

Smith, 1854, p. 399, ♀, ♂, Hudson Bay (see Meade-Waldo, 1916, p. 469). (Redescribed: Franklin, 1912, p. 360.)

Frison, 1926, p. 135.

Range: Canada to New Mexico.

B. frigidus is rare throughout the entire United States. Only two specimens have been taken in Oregon. It appears to be confined in Oregon to the mountain regions in the western part of the state.

Grave Creek (Josephine County), ☿, VI-30, 1925 (H. A. S.), Oregon (Josephine County), ☿, VII-5, 1925 (H. A. S.).

19. BREMUS FLAVIFRONS (Cresson)

Cresson, 1863, p. 105, ♀, ☿, ♂, Fort Yukon, Alaska, Hudson Bay Territory, Kansas ("The latter is probably erroneous" Lutz and Cockerell, 1920, p. 515). (Redescribed: Franklin, 1913, p. 368.)

Frison, 1926, p. 135.

Range: Alaska to New Mexico and east to Colorado.

This species appears to be rare in Oregon and is possibly limited to the Coast Range and the lower altitudes in the Cascades. Only males have been taken in the state, with the exception of the one queen taken at Forest Grove by A. C. Burrill, May 21, 1919 (Frison, 1921, p. 146).

Alsea Mountain, ♂, VII-20, 1921 (H. A. S.); ♂, VIII-2, 1921 (H. A. S.). Bellfountain, ♂, VII-13, 1924 (H. A. S.); Cascadia, ♂, VIII-8, 1924 (H. A. S.).

20. BREMUS FLAVIFRONS var. AMBIGUUS (Franklin)

Franklin, 1911, p. 159, ♀, ☿, Sisson and Santa Cruz Mountains, California, Keyport, Washington. (Redescribed: Franklin, 1912, p. 376.)

Frison, 1926, p. 135.

Range: Washington, Oregon, and California.

Franklin (1912, p. 194), lists this variety for Oregon. He apparently assumed it was in Oregon, since it had been taken in both Washington and California. The only records from the state are those given below. This variety seems to be very rare.

Hugo, ♂, VII-1, 1925 (H. A. S.). Three Sisters region; Fingerboard Prairie (elevation 3825 feet), ♀, VIII-14, 1926 (H. A. S.).

21. BREMUS FLAVIFRONS var. DIMIDIATUS (Ashmead)

Ashmead, 1902, p. 129, ♀, ♂, Fox Point and Wrangell (Wickham), Alaska. (Redescribed: Franklin, 1912, p. 370.)

Frison, 1926, p. 135.

Range: Alaska to Oregon.

This species has been taken in both the Coast and Cascade Mountains. It appears to be rare in the state.

Alsea, ♀, VI-4, 1921 (H. A. S.); ♂, VIII-2, 1921 (H. A. S.). Belknap Springs, ♂, VIII-10, 1925 (G. R. McG.). McKenzie Bridge (elevation 1329 feet), ♂, VIII-27, 1924 (H. A. S.). Sexton Mountain (Josephine County, elevation 2046 feet), ♂, VI-30, 1925 (H. A. S.). Three Sisters region; Frog Camp (elevation 4700 feet), ♂, VIII-15, 1926 (H. A. S.). Wahtum Lake (Mount Hood region, elevation 3700 feet), ♂, VIII-24, 1923 (H. A. S.).

22. BREMUS CENTRALIS (Cresson)

Cresson, 1864, p. 41, ♀, Fort Creek, California (Ulke); 1879, p. 231, Colorado.

The only record of this species from western Oregon is a male taken by M. M. Rheer at Wilson (Tillamook County), August 7, 1916, and a worker taken at Crater Lake, July 19 (Frison, 1927, p. 371).

23. BREMUS APPOSITUS (Cresson)

Cresson, 1878, p. 183, ♀, ♂, ♂, Colorado, New Mexico, Utah, Nevada. (Redescribed: Franklin, 1912, p. 285.)

Franklin, 1913, p. 288; Frison, 1927, p. 372, Crater Lake, Mount Hood.

Range: East to South Dakota (Frison, 1926, p. 136), and from British Columbia south to the Mexican border.

Occurs throughout western Oregon from 174 feet to about 4650 feet. Common in the Willamette Valley. Less common along the coast.

Albany, ♂, VII-8, 1921 (H. A. S.); ♂, VII-8, 1921 (H. A. S.), to VIII-10, 1917 (A. H. A.). Alsea, ♀, VII-29, 1922 (H. A. S.), to VIII-2, 1921; ♂, VIII-5, 1921 (H. A. S.), to VIII-18, 1917 (A. H. A.). Alsea Mountain, ♂, VIII-2, 1925 (H. A. S.). Corvallis, ♀, III-11, 1926 (H. A. S.), to IX-28, 1905 (Thomson); ♂, VII-4 (W. J. C.), to VIII-3, 1900, ♂, V-27, 1906 (Farrell), to VIII, 1906 (Buchanan). Hillsboro, ♂, VII-8, 1905 (Cate), Kings Valley (Benton County), ♀ and ♂, VII-20, 1905 (Vincent). McKenzie Pass (elevation 4650 feet); ♂, VIII-10, 1925 (G. R. McG.). Medford, ♀, VI-23, 1906 (Bennett); ♂, VII-25, 1906 (Bennett). Monroe, ♂ and ♂, VII-25, 1905 (Nichols). Portland, ♂, VIII-27, 1907. Salem, ♂, IX-24, 1921 (H. A. S.). Tangent, ♂, VII-7, 1922 (H. A. S.).

24. BREMUS FERVIDUS (Fabricius)

Fabricius, 1798, p. 274 (Apis), North America. (Redescribed: Franklin, 1912, p. 388.).

B. pennsylvanicus (Viereck) *et al.*, 1904, p. 98, Condon, Oregon (Cordley).

Range: Southern Canada and the United States, with the possible exception of the extreme southeast.

B. fervidus is not uncommon in the lower altitudes of western Oregon and has been taken as high as 4000 feet.

Albany, ♂, VIII-10, 1917 (A. H. A.). Alsea Mountain, ♂, VIII-2, 1925, and VIII-5, 1924 (both H. A. S.). Corvallis, ♂, VII-17, 1925 (H. A. S.), to VII-29, 1914 (L. G. Gentner). Mary's Peak (elevation 4000 feet), ♂, VII-7, 1914 (A. L. L.). Peedee, ♂, VI-20, 1905 (Vincent), Sherwood, ♂, VII-29, 1906 (Hays).

25. BREMUS CALIFORNICUS (Smith)

Smith, 1854, p. 400, n. 57, ♀, (not the ♂), California. (Redescribed: Franklin, 1912, p. 393.)

Cresson, 1879, p. 230, Oregon; Viereck *et al.*, 1904, p. 99, Corvallis and Mount Hood, Oregon; Franklin, 1912, p. 398, Oregon; Frison, 1927, p. 373, Olney, Newport, Colestin, Corvallis, Mary's Peak (Benton County), Oregon.

Range: Alaska to Lower California and east to the Rocky Mountains. *B. californicus* appears to be confined to the lower valleys. It is one of the more common species in the Willamette Valley and along the coast.

Albany, ♀, VII-31, 1917 (M. C. Lane); ♂, VIII-10, 1917 (A. H. A.). Alsea, ☿, VII-1, 1925 (H. A. S.), to VIII-18, 1917 (A. H. A.). Amity, ♂, VII-13, 1900 (Smith). Bellfountain, ☿, VII-13, 1924 (H. A. S.). Coos Bay, ☿, VII-3, 1926 (H. A. S.). Corvallis, ♀, IV-3, 1906 (Farrell), to IX-24, 1906 (Sprague); ♂, VIII, 1907, to IX-4, 1921 (H. A. S.); ☿, VI-20, 1924 (H. A. S.), to VIII-30, 1907. Eugene, V-23, 1922 (H. A. S.). Forest Grove, ♀, V-8, 1917 (M. C. Lane), to VII-22, 1921 (L. P. R.); ♂, VII-22, 1921 (L. P. R.); ☿, VII-15, 1921 (L. P. R.), to IX-17, 1915 (L. P. R.). Grants Pass, ☿, VII-1, 1925 (H. A. S.). Medford, ☿, VI-25, 1906 (Bennett). Milwaukee, ♀, IX, 1907 (Hazel Allen). Peedee, ☿, VII-20, 1905 (Vincent). Portland, ☿, VII-19, 1907 (Hazel Allen). Salem, ♀, IX-24, 1921, and IX-28, 1925 (both H. A. S.). Shedd, ♀, VIII-5, 1924 (H. A. S.). Sherwood, ♀, VIII-9, 1906.

26. BREMUS CALIFORNICUS var. CONSANGUINEUS (Handlirsch)

Handlirsch, 1888, p. 239, Vancouver Island and mainland, British Columbia.

Range: Washington, Oregon, and California.

This rare variety has been taken only at Ashland and Corvallis.

Ashland, ♂, VII-2, 1926 (H. A. S.). Corvallis, ♂, VII-25 and IX-4, 1925 (D. A. W.).

27. BREMUS CALIFORNICUS var. DUBIUS (Cresson)

Cresson, 1863, p. 97, western Kansas (Norton).

Range: Oregon, Washington, California, and Colorado.

The only records of this variety for western Oregon are two queens taken by the writer April 24, 1926, and May 10, 1925, at Corvallis.

1. PSITHYRUS INSULARIS Smith

Smith, 1861, p. 155 (*Apathus*), ♀, Vancouver Island, British Columbia (Lyall). (Redescribed: Franklin, 1912, p. 455.)

Bombus interruptus Green, 1858, p. 11, ♀, Oregon; Viereck *et al.*, 1904, p. 100, ♂, ♀, Corvallis (Cordley); Franklin, 1912, p. 457, Oregon; Sladen, 1915, p. 84 (records taking a *P. insularis* in the nest of *Bremus flavifrons*); Frison, 1927, p. 374, Newport, Oregon.

Range: Alaska to Oregon, Colorado, and New Mexico (high altitudes), east to Nebraska.

The species seems to be rare in western Oregon. It ranges from sea-level to about 6000 feet elevation.

Coos Bay, ♂, VI-16 to VII-3, 1926 (both H. A. S.). Corvallis, ♀, 1898. Cascadia, ♂, VIII-2, 1924 (H. A. S.). Mary's Peak (Benton County, elevation 4000 feet), ♂, VIII-2, 1926 (H. A. S.). Newport, ♀, V-15 and V-30, 1926 (both H. A. S.). Sand Mountain (Santiam Forest, elevation about 5475 feet), ♀, VI-20, 1906. Triangle Lake (Lane County), ♀, V-24, 1925 (H. A. S.).

2. PSITHYRUS CRAWFORDI Franklin

Franklin, 1912, p. 464, ♀, ♂, Placer County, California, Oregon. Frison, 1926, p. 137; 1927, p. 374, Newport, Oregon.

Range: Probably southwestern United States.

No locality is given for the type taken in Oregon. The species has been taken in only three recorded localities in the state. Apparently it is a coastal form. One unlabeled queen is in the collection at the Oregon State Agricultural College.

Alsea, ♂, VIII-2, 1921 (H. A. S.). Waldport (Lincoln County), ♂, VI-5, 1925 (H. A. S.). Coos Bay, ♀, VII-3, 1926 (H. A. S.); ♂, VI-16 to VII-20, 1926 (both H. A. S.).

Bequaert and Plath (1925, p. 274), suggest that "the host of *P. crawfordi* is either *Bremus vosnesenskii* or *B. occidentalis.*"

3. PSITHYRUS SUCKLEYI Green

Green, 1860, p. 169, ♀, Puget Sound (Suckley). (Redescribed: Franklin, 1912, p. 471.)

Bequaert and Plath, 1925, p. 275, Mary's Peak (Benton County), Oregon (W. J. Chamberlin, collector); Frison, 1926, p. 137; 1927, p. 373, Mount Hood, Oregon.

Range: British Columbia to California and east to Colorado.

The localities from which this species is recorded indicate it is more common at altitudes of about 4000 feet. Males were abundant August 14, 1926, on *Rudbeckia occidentalis* in the Three Sisters region at an elevation of 3825 feet.

Albany, ♂, VIII-10, 1917 (A. H. A.). Alsea, ♂, VIII-10 and VIII-18, 1917 (A. H. A.). Corvallis, ♀, IV-25, 1926 (H. A. S.), ♂, VIII-10, 1917 (A. H. A.). Graham (?), ♀, VII-14, 1906. Mary's Peak (elevation 4000 feet), ♀, V-30, 1924 (H. A. S.), ♂, VIII-2, 1926 (H. A. S.). Waldport, ♂, VI-5, 1925 (H. A. S.). The Three Sisters region; Deer Butte (elevation 4650 feet), ♂, VIII-9, 1926 (H. A. S.); Fingerboard Prairie (elevation 3825 feet), ♀, and ♂, VIII-14, 1926 (H. A. S.); Scott Lake (elevation 4650 feet), ♀, VIII-7, 1926 (H. A. S.); ♂, VIII-2 to VIII-15, 1926 (H. A. S.).

4. PSITHYRUS FERNALDÆ Franklin

Franklin, 1911, p. 164, ♀, Orono, Maine; Amherst, Massachusetts; Webster, Durham, Crawfords, Mount Washington and Conway, New Hampshire; Ithaca, New York; Mount Rainier, Washington; Kaslo and Metlakatla, British Columbia; Nushagak and Sitka, Alaska. (Redescribed: Franklin, 1912, p. 473.)

Frison, 1922, p. 326, ♂, Corvallis, Oregon; 1926, p. 137; 1927, p. 374, Waldport, Newport, Marshfield, Oregon.

Range: Alaska, Canada, and the United States south to the upper Mississippi Valley, Colorado, and northern California, east to the Atlantic Ocean.

This species appears to be more common in the coast mountains and lower Cascades than elsewhere.

Alsea, ♀, VI-4, 1921 (H. A. S.); ♂, VIII-18, 1917 (A. H. A.). Brookings, ♂, VII-8, 1925 (H. A. S.). Sexton Mountain (Josephine County, elevation 2046 feet), ♂, VI-30, 1925 (H. A. S.). Triangle Lake (Lane County), ♂, V-24, 1925 (H. A. S.). Wahtum Lake Mount Hood region elevation 3700 feet, ♂, VII-24, 1923 (H. A. S.). Waldport, ♂, VI-5, 1925 (H. A. S.).

5. PSITHYRUS FERNALDÆ var. WHEELERI (Bequaert and Plath)

Bequaert and Plath, 1925, p. 265, ♀, ♂, holotype, M. C. Z., 15,280, female; Oregon, Benton County, Mary's Peak, July, 1916 (W. J. Chamberlin, collector); paratype, female, Cala., Sierra Nevada (Edwards, collector). Allotype and paratype, males, Cala., Alta Meadow, Sequoia National Park, 9000 feet, August 23, 1917 (Cornell University Biological Expedition, W. M. Wheeler collector).

Frison, 1927, p. 374. Mount Hood, Waldport, Marshfield.

Except for the types listed above, the following are the only records for Oregon. The variety seems to be rare, but widely distributed over western Oregon.

Alsea, ♂, V-29, 1926 (H. A. S.). Coos Bay, ♂, VI-20 and VII-20, 1926 (both H. A. S.). Mary's Peak (Benton County, elevation 4000 feet), ♂, VIII-2, 1926 (H. A. S.). Neah-Kah-Nie Mountain (Tillamook County), ♂, VI-29, 1919 (L. P. R.). Newport, ♂, V-15, 1926 (H. A. S.). Three Sisters region; Fingerboard Prairie (elevation 3825 feet), ♂, VIII-14, 1926 (H. A. S.); Frog Camp (elevation 4700 feet), ♂, VIII-15, 1926 (H. A. S.); Scott Lake (elevation 4650 feet), ♂, VIII-7, 1926 (H. A. S.).

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B. Rice Bugs

During past years, and particularly during 1926 and 1927, there have been numerous reports relative to the injury to rice by certain so-called rice bugs. These insects appear in the rice fields just as the heads of grain are beginning to form and feed upon the kernels causing deformation and spotting known as "pecky rice." Two species received from F. Brunk, Cajeme, Sonora, Mexico, on September 20, 1927, were determined by E. P. Van Duzee of the California Academy of Sciences as *Soluba insularis* Stål and *Mormidea prominula* Dallas. They are closely related genera of the family *Pentatomidæ*. The requests from the rice growers of Mexico for assistance in the control of these and other pests cannot possibly be met from this long distance, regardless of our desire to help them. Rather it will be necessary to have an entomologist at hand during much of the year or at least during the growing period of the crop to adequately work on the life history of the insects and advise as to control measures.—E. O. Essig.

CALIFORNIA MICROLEPIDOPTERA III

BY H. H. KEIFER
San Francisco, California

GELECHIIDÆ

Recurvaria ceanothiella Braun

This species, which was described from the yellow pine forest region of the Sierra Nevada mountains as feeding on *Ceanothus divaricatus* Nutt., is here recorded from Marin County, California, as occurring at Mill Valley, Phoenix Lake, and Lagunitas. In Marin County *Ceanothus thyrsiflorus* Esch. and *C. sorediatus* H. and A. are the species infested. *Ceanothus thyrsiflorus* and *sorediatus* are very similar and occur in the coastal humid region. *C. divaricatus* is evidently much the same as it occurs in a region which has many of the same or closely related plants to those of the coast. It may be mentioned here that some species of the genus Ceanothus are entirely unsuited in structure to the needs of this moth.

The larva of *ceanothiella* is a leaf miner as described by Miss Braun. The mine is narrow and linear at first, with side branches. The main part of the mine is typically "horseshoe" shaped, extending apically along one side of the midrib, curving over below the apex, and back on the other side. The larva with head inward may be found at one end of the main gallery in the entrance hole, which opens from the underside of the leaf and over which is spun a silken covering. The frass is voided, none being found in the mine. On nearing maturity the larva mines out the leaf in all directions, forming more of a blotch mine and scattering the frass throughout. These mines were noted from March 5 to April 16, 1927. Pupation is as described by Miss Braun.

The body of a young larva is creamy white, but on nearing pupation is as follows: Body generally cream-white, heavily overlaid pink; head flattened, ochreous or light brown, sides blackish; prothoracic shield body-color or slightly ochreous; last abdominal segment and anal plate lighter than abdomen; tubercles very weak, uncolored; hairs short, colorless; crochets unevenly biordinal, circle complete, 18 to 22; length 6 mm.

Pupa: Anterior end rather blunt, body widest at metathorax, tapering to rather acute caudal end; ventral line from middle of body to caudal end more convex than corresponding dorsal line; brownish or brownish-ochreous; surface glaberous except for usual hairs which

are short and inconspicuous. Maxillæ rather wide at base, short, ending at convergence of midlegs; forelegs ending along sides of maxillæ; midlegs ending at convergence of antennæ; antennæ diverging just before tips exposing ends of hind legs, which end even with antennæ and wing cases on, or a little past, anterior margin of the seventh abdominal segment. Abdomen quite short, extreme tip blunt, no free segments, no cremaster but a number of hooked hairs on caudal end. Length, 3½ to 4 mm.

The male genitalia of this species are small, entirely lacking harpes. The uncus and œdeagus are the only conspicuous parts, supported by a heavy tegumen.

Adults emerged in the laboratory from April 20 to June 10, 1927.

Recurvaria francisca Keifer, new species

This grayish species is very similar to the preceding in adult appearance, but the ground color is not as definitely ochreous-tinged if at all, and the dark coloring is noticeably not as black. There are greater differences than the adult appearance which will be subsequently noted. This is, however, an obscurely marked species, and the following description attempts to take in the variations:

Palpi rather slender; basal two-thirds of second joint black, white above inwardly, apical third white mottled blackish or with an incomplete black annulus; terminal joint inclined to be rough apically, white, black at extreme base, black annulus just below middle, wide black annulus just below tip, extreme tip white. Antennæ with basal joint whitish below in front, blackish fuscous above; stalk usually with alternately lighter and darker annulæ, the lighter widest. Head above white, each scale tipped dark fuscous; face white slightly ochreous, shining, faintly mottled fuscous at sides. Thorax white generally obscured by dark fuscous; two opposite black dots touching posterior margin just before tip; tegulæ as head. Forewings whitish, each scale tipped with dark fuscous, with a number of black dots on wings and three dorsal scale tufts; a blackish shade from costal base, running obliquely outward and ending just across fold in black tuft which is outwardly white, opposite which well within costa is a black spot more or less completely edged white; just beyond these at costal third a conspicuous black spot more or less surrounded by white, opposite which is a black dorsal tuft touching the fold and between these a black spot, sometimes edged outwardly by a white spot which is often followed by another black dot; the third black tuft well within tornus, and almost opposite this from costa, a more or less distinct narrow whitish fascia runs directly in for a short distance, turns abruptly outward and curves down to outer margin not halfway to apex from tornal tuft; a blackish apical

spot at base of cilia preceded on bases of costal and outer marginal cilia by two or three more or less distinct black spots; sometimes a blackish area well within apex; tornal cilia light fuscous. Hind wings light fuscous, cilia same, slightly ochreous-tinged. Abdomen whitish suffused fuscous, darker dorsally. Fore and midlegs white, heavily overlaid except at apices of joints with blackish fuscous; hind legs ochreous white, a broad fuscous stripe along outer side of tibiæ, broken by a white spot at inner spurs, tarsi mottled fuscous at bases outwardly. Expanse, 8 to 12 mm.

Holotype, male, No. 2539, and *allotype,* female, No. 2540, Mus. Calif. Acad. Sci., reared from *Ceanothus thyrsiflorus* Esch. in **San Francisco, California,** by the author, April 27 and 25, 1927, respectively. Fifty-three *paratypes,* males and females, reared from *Ceanothus thyrsiflorus,* collected in San Francisco, and in Mill Valley, Marin County. Eight paratypes from *Ceanothus sorediatus* H. and A., the larva collected at Phoenix Lake, Marin County. These paratypes emerged from February 13 to August 19, 1927. The specimens from Marin County are generally less maculated than those from San Francisco, but agree in general appearance, larval habit and genitalia. Four paratypes are in the collection of Miss A. F. Braun, four in the collection of Dr. Barnes, and four in the United States National Museum.

The genitalia of *francisca* are small but with all the usual organs present. The harpes are rather short, slender and symmetrical, with large basal lobes. Thus *francisca* differs from *ceanothiella* in possessing harpes.

The mine of the new species is a rusty-colored blotch, typically beginning at or near the apex of the leaf. The entire substance between the two epidermal layers of from one-half to the whole leaf is eaten in the course of the larval life. The epidermis is preserved as nearly intact as possible and the frass is not voided but spun back in the older parts of the mine on each side of the larval retreat. On maturing, the larva cuts its way out of the newer portion of the mine, leaving the frass scattered, and probably pupates in trash below the bush in a cocoon spun between two or more objects. Mature larvæ were found from late January to June, 1927.

The young larva has a black head and shield with a sordid white or grayish body. Later the body becomes whiter and then slightly bluish. *Mature larva:* Head flattened, deep brownish black with brown mouthparts; thoracic shield variously shaded with brownish black,

usually almost body-color anteriorly, grading into deep brownish black on posterior half or two-thirds, median line narrow. Body usually bluish white more or less overlaid pink especially on abdomen; anal plate yellowish to fuscous; gonads dark fuscous; ganglia visible ventrally; thoracic legs black on chitinized parts; prolegs often with a fuscous annulus, crochets in a complete circle, unevenly biordinal, 22 to 28; tubercles very weak, uncolored, hairs fine, uncolored; length, 6 to 7 mm.

The pupa is essentially the same as that described for *ceanothiella* but differing in that the maxillæ are slightly shorter, the maxillary palpi smaller and the hind legs more nearly approaching the posterior margin of the seventh abdominal segment.

The most striking external differences between *francisca* and *ceanothiella* are in the larval appearance and habit, which may be summarized as follows: *francisca*—head and shield of larva blackish, body sordid white or bluish white, mine a blotch, frass not voided; *ceanothiella*—head of larva ochreous, shield and body creamy white, mine typically linear and branching, frass voided through a hole at one end of the mine.

In placing the new species in the genus Recurvaria the venational characters were relied upon to the exclusion of the genitalic and larval characters. The only point of difference which either of these species shows from the genus Tosca is in the venation, which is as in the genus Recurvaria; all other characters mentioned in the definition of Tosca are present. A comparison of the pupæ of these species with that of *Recurvaria baccharíella* Keifer (a true Recurvaria) shows several marked differences: *francisca* and *ceanothiella*—pupa with maxillæ ending at the convergence of the midlegs, abdomen with no movable sutures and much shortened; *baccharíella*—maxillæ of pupa ending at convergence of antennæ, abdomen not shortened and with three flexible sutures. It does not appear advisable to disregard the venation at present, but it is felt that this combination of characters should be mentioned .

Orthoptera wanted

I am revising the species of the genera *Ceuthophilus* and *Pristoceuthophilus* (Orthoptera, Tettigoniidæ, Rhaphidophorinæ), and will be glad to determine material of these genera from any part of the country. I desire especially to see western material. —T. H. Hubbell, Museum of Zoology, University of Michigan, Ann Arbor, Michigan.

ON THE IDENTITY OF FOUR SPECIES OF GEOMETRIDÆ (LEPIDOPTERA)

BY WILLIAM BARNES AND F. H. BENJAMIN
Decatur, Illinois

LEPIODES SCOLOPACINARIUS Gn.

This species was described by Guenée, 1857, Spec. Gen., X, 360, from 1 ♂ 1 ♀. A male and female from the Oberthür collection are in the Barnes collection. These bear labels "Etats Unis," "Ex Musæo Ach. Guenée," "Ex Typicalibus Specimibus." The last-mentioned label is a subsequent one often pinned on Guenée collection specimens; in one case this label is on the pin of a specimen which also bears a Guenée handwritten label saying the specimen served for his description; at other times the same labels are on specimens which are not likely to be types. The exact meaning of the label is, therefore, vague.

The pair of *scolopacinarius* were sent as types, and as they agree perfectly with the original description, the male being the dark form and the female the light form, there is every reason to consider these specimens types, or at last typical.

The species appears to be more variable in the male than in the female, the dark male form appearing to be much more common than the pale male form, and hence both type form and normal form. Incidentally all intergrades occur between the dark and light males. If the species' name is held to the common dark male the synonymy will be:

Tornos scolopacinarius *Gn.*
pervelata Wlk.
robiginosus Morr.
rubiginosaria Pack.
abjectarius Hlst.
piazzata C. and S.
calcasiata C. and S. (partim., ♀ nec ♂).
form ♂ calcasiata *C. and S.*

We cannot distinguish between ♂ ♀ *piazzata* and ♂ ♀ *scolopacinarius,* nor can we distinguish between paratype females of *piazzata* and *calcasiata.* According to paratypes of *kerrvillaria* C. and S. this name will probably also fall to *scolopacinarius.*

HYDRIOMENA PLUVIATA Gn.

1857, Guenée, Sp. Gén., X, 378, *Ypsipetes.*
1876, Packard, Mono. Geom., p. 91, *trifasciata, Hydriomena.*
1912, Swett, Can. Ent., XLIV, 226-227, *Hydriomena.*
1917, Barnes and McDunnough, Contrib., IV, (1), 24, (partim. nec figs.), *Hydriomena.*
1920, Oberthür, Et. Lép. Comp., XVII, 203, pl. DVII, ff. 4237-4238, *Ypsipetes.*
1921, Barnes and Lindsey, Ent. News, XXXII, 254, *Hydriomena.*
1922, McDunnough, Ent. News, XXXIII, 229, *Ypsipetes.*

This name seems to have caused considerable confusion. Packard placed it as a synonym of *trifasciata* Bork.; Barnes and McDunnough, as being the same as *divisaria* Wlk.; Swett suggested *pluviata* as possibly the correct name for *cærulata* Auct. nec Fabr. with *perfracta* Swett as being the variety mentioned by Guenée; Barnes and Lindsey placed Oberthür's figure 4238 as *cærulata* Fabr., a species probably not occurring in North America, but comment that they cannot place figure 4237; McDunnough stated Oberthür's figures not conspecific, and restricted the name to the species figured as 4238, assigning figure 4237 to *? renunciata,* and 4238 to *frigidata.*

Both specimens figured by Oberthür are in the Barnes collection. They bear labels "Ex Musæo Ach. Guenée," and "Ex Typicalibus Speciminibus," the female (Oberthür f. 4237) also bearing a label "Am. bor."

We have above commented on the meaning of the label "Ex Typicalibus Speciminibus." We suspect that these specimens are types, and that McDunnough's restriction will hold.

The female is in very poor condition, rubbed, and lacking abdomen. The t. a. line, however, can be discerned, and it is rather irregular, suggesting that McDunnough's placement as *renunciata* is correct.

The male to which McDunnough restricted the name is different from any of our *frigidata.* Examination of the uncus shows the tubercle or ridge at the base, the character used in the Barnes and McDunnough Hydriomenid Revision to separate *transfigurata* Swett from *frigidata.* We possess a single male paratype of *transfigurata.* The male *pluviata* agrees with this in all details of maculation as well as genitalia. We have not made a slide of the male *pluviata,* but its uncus is plainly visible.

The name *frigidata* Wlk. may, therefore, be restored as a valid species; *pluviata* Gn. (partim., ♂ nec ♀) takes priority over *transfigurata* Swett; *renunciata* Wlk. takes as synonym *pluviata* Gn. (partim., ♀ nec ♂).

ACIDALIA PURATA Gn.

This species was described by Guenée, 1857, Spec. Gén., IX, 488.

There are four old examples in the Barnes collection received under this name from the Oberthür collection including the specimen figured by Oberthür (f. 5083) which is labeled type in Oberthür's handwriting. We have little doubt that some of these examples are types. Three of them are of the species going in collections as *nigrocandida* Hlst. and supplied to us under that name by Mr. Lemmer. The other specimen appears to be *lautaria* Hbn. As *lautaria* was redescribed by Guenée as *myrmidonata* we rather suspect that the fourth example is not a type of *purata*.

We have been unable to compare with Hulst's type, but have little doubt that *nigrocandida* has been correctly determined in the past. We know of nothing else which might fit Hulst's description.

Guenée figured *purata* (Atlas, pl. VII, f. 6). This figure does not resemble the supposed types and violates the original description. We suspect that the figure was carelessly made and also that lead in the paint pigments has caused not only this figure, but other figures in the Guenée Atlas to become considerably darkened. The supposed types agree perfectly with Guenée's description.

Acidalia cacuminaria Morr. (*cacuminata* Pack.) takes the place of *purata* Auct. nec Gn. By no stretch of the imagination can *cacuminaria* be made to fit Guenée's description of *purata*.

EURYMENE EMARGATARIA Gn.

Guenée, 1857, Spec. Gén., IX, 145, proposed the name *emargataria* as a nom. nov. for *fervidaria* H.-S. nec Hbn., but at the same time states, "J'avais décrit cette espèce depuis longtemps, quand la figure de M. Herrich-Schæffer a paru."

The correct use of the name *emargataria* presents problems in nomenclature which do not seem to be entirely covered by the present International Code.

Herrich-Schæffer described *fervidaria*, 1855, Ausser. Schmett., p. 63, f. 203, as *Plagodis fervidaria* (Ellopia Gn.), and on page 80 places his specific name in the genus *Eurymene* also citing *Ellopia* "Gn." and *Plagodis*.

Guenée's rule of homonyms does not correspond with our present ideas in that he would not allow the same specific name to be employed twice in any family. This is probably the reason he sunk *fervidaria* H-S. as a homonym of *fervidaria* Hbn. Nevertheless, Guenée employs *Ellopia* Treit. for *fervidaria* Hbn., and also the Hubnerian specific name is at present placed in *Ellopia*.

The question at once arises, "Is *fervidaria* H.-S. in reality a homonym of *fervidaria* Hbn. because of the Herrich-Schæffer citation of "(*Ellopia* Gn.)."

The original female specimen from which Guenée described *emargataria* (in part) and which served as the type for his manuscript name is not the same as *fervidaria* H.-S., unless the Herrich-Schaæffer figure be very poor, and is the species going in collections as *arrogaria* Hlst.

In view of Opinions 53 and 78 of the International Zoological Commission Guenée's manuscript type acquired status upon its publication in 1857, even though Guenée misdetermined the Herrich-Schæffer species and considered his species to be the same.

On the other hand a name proposed as a nom. nov. is usually considered to have as its type the type of the older name.

Thus *emargataria* Gn. (partim.) appears applicable and available for two different species.

Not knowing just what to do with the name *emargataria* we are listing it under both *fervidaria* H.-S. and *arrogaria* Hlst., leaving the final settlement of the problem to some subsequent revisional worker.

Celerio gallii intermedia Kirby

An individual of this hawkmoth was taken by Mr. George Haley at flowers of Polymonium, July 1926, on St. Paul Island, Alaska. Dr. G. Dallas Hanna had taken one on that island some years before, and a Dr. Hunter had seen one at light on the Station window, so this moth may be added to the fauna of that island.

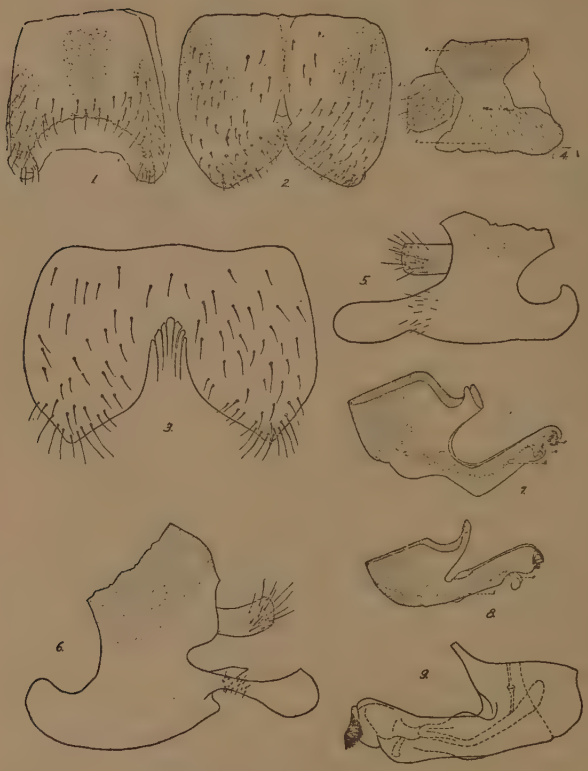
DISTINCTION BETWEEN THREE SPECIES OF EUMERUS (SYRPHIDÆ, DIPTERA), WITH DESCRIPTION OF A NEW SPECIES

BY LESLIE M. SMITH
Berkeley, California

Knowledge of the species of *Eumerus* now established in the United States seems to be very meager. Most writers have published notes on damage, and occurrence, under the name of *Eumerus strigatus* Fallén. Although some sixty species, many of which are probably synonyms, are recorded in Europe, most American workers have regarded all specimens taken in this country as *E. strigatus.* In an article published in *Entomologist's Monthly Magazine,* May 1920, Mr J. E. Collin called attention to the fact that *E. strigatus* was not the only injurious species of this genus, but that the little known species, *E. tuberculatus* Rondani, was often found attacking bulbs. Mr. Collin pointed out that many references to *E. strigatus* probably referred to *E. tuberculatus.*

While making a study of the internal anatomy of the male reproductive system of what was believed to be *E. strigatus,* the writer became aware of the fact that two species were being examined. Investigation of the literature, together with determinations by several authorities on this group, showed one species to be *E. tuberculatus* while no name could be found for the other. Obviously it was not *E. strigatus.* All of the specimens were reared from bulbs of Narcissus collected in Santa Cruz, California.

The three species here dealt with, namely, *Eumerus strigatus* Fallén, *E. tuberculatus* Rondani, and *E. narcissi* n. sp., are so nearly identical in appearance that they can be distinguished only with considerable difficulty. Dr. F. R. Cole in *Entomological News,* Vol. XXXI, p. 31, 1920, gives a complete description of *E. strigatus.* The other two species differ so slightly from this that a general description will be omitted here and only certain characters in which they vary will be mentioned. Of these characters the shape of the fifth sternite, and certain features of the anal appendages and genitalia are most valu-



Explanation of Figures

Fig. 1. Fifth sternite of *E. narcissi.*
2. Fifth sternite of *E. tuberculatus.*
3. Fifth sternite of *E. strigatus.*
4. Lateral view of anal appendages of *E. narcissi.*
b—anal cercus; c—style.
5. Lateral view of anal appendages of *E. tuberculatus.*
6. Lateral view of anal appendages of *E. strigatus.*
7. Lateral view of genitalia of *E. narcissi.*
a—position of internal lobes, b—position of sustentacular apodeme, c—superior lobe.
8. Lateral view of genitalia of *E. tuberculatus.*
9. Lateral view of genitalia of *E. strigatus.*

All figures by about 110. Fig. 9 redrawn from Collin.

able. Mr. Collin in the reference previously cited illustrated the characters above mentioned. In the following descriptions of the male terminalia, the terminology suggested by C. L. Metcalf (Ann. Ent. Soc. Am., Vol. 14, p. 169), is used.

EUMERUS STRIGATUS Fallén

Male. Fifth sternite with a notch in the median line of the posterior margin. Postero-lateral corners of chitinized area of fifth sternite gently rounded to give a bilobed appearance. Margin of each pseudolobe entire. Anal cerci small, club-shaped, bent away from the styles. Styles elongate, bearing a distinct terminal enlargement and a lateral accessory tooth on the inner surface. Genitalia straight. Superior lobes terminal on sheaths. Hind femora and tarsi without basal tubercles below. (See Figs. 3, 6, and 9.)

Length, 5.5 to 7.5 mm.

EUMERUS TUBERCULATUS Rondani

Male. Fifth sternite with a notch in the median line of posterior margin. Sides of the notch indented laterally into the sternite. Chitinization heavy on the sides, membranous in the median line. Lateral corners somewhat rounded, giving a bilobed appearance. Margin of each pseudolobe entire. Anal cerci small, straight-sided and bluntly truncate, not bent away from styles. Styles elongate, not greatly enlarged terminally, bearing no accessory tooth, having distally a few heavy, recurved spines on the inner surface. Genitalia straight. Superior lobes terminal on sheaths. Hind femora and tarsi bearing basal tubercles below. (See figs. 2, 5, and 8.)

Length, 5.5 to 7.0 mm.

Eumerus narcissi L. Smith, spec. nov.

Male. In general appearance closely resembling the other two species mentioned. Fifth sternite without a notch in posterior margin. Posterior margin arcuato-emarginate, covered with minute, blunt projections. Postero-lateral corners prolonged. Chitinization heavy in the center. Anal cerci large, nearly rectangular in lateral view. Styles very much reduced, no terminal enlargement. Genitalia with a distinct angle. Superior lobes slightly subterminal. Hind femora and tarsi without basal tubercles below.

Length, 5.5 to 7.0 mm.

Thus far the author has not been able to distinguish the females of these various species, but no doubt future studies of these closely related forms will reveal characters by which they may be recognized.

THE GENUS BRACHYPTEROMYIA WILLISTON (DIPTERA PUPIPARA; HIPPOBOSCIDÆ)

BY G. F. FERRIS

Stanford University, California

The genus *Brachypteromyia,* of the family Hippoboscidæ, was named by Williston in 1896 for the reception of the single species, *B. femorata* Williston. It has since been recognized that this species is unquestionably identical with the earlier described *Anapera fimbriata* Waterhouse, but the genus *Brachypteromyia* has been accepted as valid. Through the kindness of Dr. V. M. Tanner I have been enabled to examine two specimens of this species. It is evident that the genus is purely a synonym of *Myiophthiria* Rondani.

These two genera have presumably been separable by the character of the wings. In *Brachypteromyia* they are described as "minute, projecting but little beyond the scutellum," while in *Myiophthiria* they attain about half the length of the abdomen. With the rediscovery of the type species of *Brachypteromyia* it appears that this difference has been exaggerated. Although the wings in the latter species are shorter than in those which have been referred to *Myiophthiria* they are of the same type and the difference cannot be regarded as more than specific.

There is the more reason for uniting the two genera, since all the species occur upon birds of the family Micropodidæ, the swifts, and to separate them generically is merely to obscure the facts concerning this peculiar distribution.

MYIOPHTHIRIA FIMBRIATA (Waterhouse)

Figures 1, 2

1887. *Anapera fimbriata* Waterhouse, *Proc. Zool. Soc., London,* 164; fig. 163.

1896. *Brachypteromyia femorata* Williston, *Ent. News,* 7:184-5.

1923. *Brachypteromyia fimbriata* (Waterhouse), Aldrich, *Insecutor Insc. Mens.,* 11:78.

1926. *Brachypteromyia fimbriata* (Waterhouse), Austen. *Parasitology,* 18:359.

Previous records. From *Aeronautes* (as *Cypselus*) *melanoleucus,* Ft. Wingate, Arizona (Waterhouse), and (as *Macropis*) from Wyoming (Williston).

Present record. A male and a female from *Aeronautes melanoleucus,* near Tuba, Arizona.

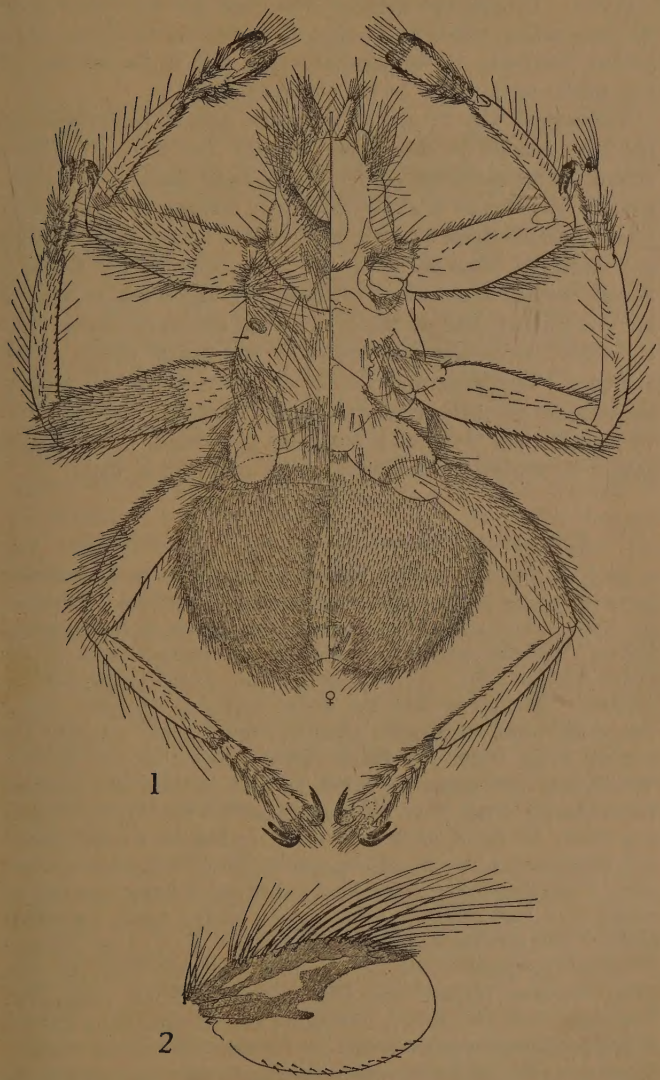


Figure 1. *Myiophthiria fimbriata* (Waterhouse); female.
Figure 2. *Myiophthiria fimbriata* (Waterhouse); wing.

Notes. Length (on slide) 8 mm. The species differs from *M. reduvioides,* which is the type of *Myiophthiria,* chiefly in its greater hairiness, in the smaller wings and in the absence of any small, dorsal plates on the abdomen (fig. 1).

The wings (fig. 2) are of the same type as in *reduvioides,* but the venation is even more reduced and confused. They extend to the posterior border of the basal plate of the abdomen. The abdomen is almost concealed beneath its vestiture of setæ, of which those near the margins are longer, both dorsally and ventrally, than those on the disc. The female shows a dorsal, median area, which is somewhat depressed, as noticed by Waterhouse, and in which the setæ are more sparse than elsewhere. In neither sex are there any dorsal plates on the abdomen. The male and female are very similar in general appearance, the male either lacking the claspers or having them very small. The œdeagus is large and prominent, but its details cannot be worked out from the single specimen at hand.

Phytonomus quadricollis Lec., a Leaf Miner

In June Dr. H. J. Pack called my attention to leaf-mining larvæ infesting *Rumex venosus* Pursh at Clearfield, Utah. On the 19th I was able to find only a few larvæ in many mined leaves. The old mines contained cocoons characteristic of the genus Phytonomus. Adult weevils were found in two of the cocoons. The larvæ left the mines and fed to some extent externally when in a moist chamber, but quickly resumed the mining habit when the leaves were handled as cut-flowers. Within the new mines the larvæ formed cocoons and pupated within two or three days. The pupal period was approximately one week. Emerged adults did some feeding on the dry leaves and continued to live about two weeks after the food was taken away from them. Dr. Pack kindly sent me a large quantity of adults that had emerged from mined leaves taken somewhat earlier. The species was determined by Dr. E. C. Van Dyke as *Phytonomus quadricollis* Lec., and a note was cited by him from "Genera Hypera and Phytonomus" (Titus, Ann. Ent. Soc. Am., Vol. IV, 1911), indicating that Norman and Evelyn Criddle collected adult weevils on *Rumex venosus* at Aweme, Manitoba. So far as the writer is able to ascertain, this is the first instance of a leaf-mining habit in the genus *Phytonomus* or in the tribe to which it belongs.—Wyatt W. Jones.

ON DINAPATE WRIGHTI HORN

BY F. H. WYMORE
Davis, California

It has been commonly supposed that the attack of the California palm borer, *Dinapate wrighti* Horn, was confined to the trunks of dead trees of the native California fan palms. During the last two years various reports received at the office of the horticultural commissioner of Riverside County, California, stated that large black beetles were injuring the growing tip of most of the transplanted fan palms about Palm Springs. On July 31, 1927, while at the Citrus Experiment Station, Riverside, I received a live female beetle through the mail with an accompanying note stating that the pest was taken from a burrow in the bud of a living fan palm at Palm Springs and that the beetles were very abundant and injuring many transplanted palms in that vicinity. Upon investigation of these reports on August 4, it was found that at least 90 per cent of the transplanted fan palms were injured by the beetles burrowing down into the succulent, growing tip of the trees. The burrows measured from five-eighths to seven-eighths inches in diameter and from about eight to sixteen inches deep. One gardener had removed as many as five beetles from a single tree and two or three were commonly taken from one tree. In a few cases it was found that the beetles had made numerous burrows into the trunks of living trees and one tree, about sixteen feet tall with a trunk about twenty inches in diameter, had been so severely injured that it had apparently succumbed to the attack in spite of an abundant water supply, and the leaves and bud had entirely withered.

Even most of the large palms which had been transplanted thirty-five or forty years ago showed the effects of beetle attack; the large characteristic masses of fibrous excelsior-like frass near the growing tip, and the elongate holes in the leaf petioles were quite common in these trees. According to the residents of Palm Springs the main flight of the beetles occurred about July 1 to 15, although some beetles were active as early as June 15 and as late as the latter part of August. Many attempts were made to control the beetles, but all resulted in killing them in most cases only after they had burrowed deeply into the plant.

THE PAN-PACIFIC ENTOMOLOGIST
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Editorial Comment

The long-expected *List of the Insects of New York State* has now been distributed as Memoir 101 of the Cornell University Agricultural Experiment Station. It is the latest and perhaps the best yet published of such state lists. In scope it covers all orders of insects with commendable thoroughness, and includes as well lists of the Arachnida and Myriopoda of that state. The number of species listed is: of insects 15,449 and of the related classes 675. This number of the insects can be compared with the 10,385 in the 1910 New Jersey list, and the 6781 in the Connecticut list.

The typography and format of this list are most excellent, the editing and proofreading have been efficiently and carefully done, and the records are concise and in most orders very complete. Unfortunately in the Lepidoptera the collectors' names were omitted in the cases of practically all the earlier records, giving an unbalanced effect to that order and working an injustice to the earlier lepidopterists. This is especially deplorable in the case of the notable group of "Albany entomologists," whose collecting at Center, New York, and in the Adirondacks was one of the highlights in the entomology of that time. We notice one error where the residence of Mr. A. R. Grote is given as Evans Center, New York. Mr. Grote's early days were spent on Staten Island and later, while located at Buffalo, he spent two or three vacation periods with friends at Evans Center, Erie County, but he never lived there, his home being then at Buffalo.

It would have been well worth while to have added a bibliography of earlier local lists of New York insects. This New York list, as a whole, is a monument to the energy and ability of the New York state entomologists.